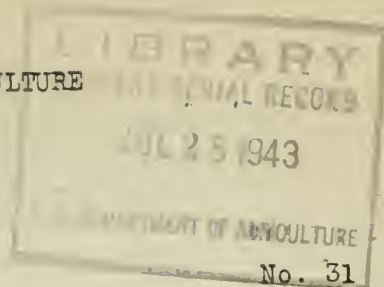


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A5-F333FOOD INFORMATION SERIES  
UNITED STATES DEPARTMENT OF AGRICULTURE  
OFFICE OF INFORMATION  
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SUBJECT: Fill the Silos

DISTRIBUTION: Food Information Calendar List

SUGGESTED USE: To be used as background material in press and radio channels and as appropriate fillers in speeches.

Immature crops of corn or sweet sorghums, and hay crops of grasses and legumes that might otherwise be damaged or lost due to early frost, drought, or excessive rain can be saved by preserving these crops as silage, according to the U. S. Department of Agriculture. Farmers are urged to use this silo method whenever practicable to extend the total supply of feeds for wartime needs.

American farmers today have pressing problems in the wartime scarcities of materials, machinery, and labor. Furthermore, in some regions there is the additional problem of a short growing season because of abnormal weather conditions. Feedstuffs must be extended and shared to keep our own and allied armies and civilians supplied with food.

Adoption of the efficient modern methods of silo preservation of green feeds will do much to compensate for the shortened growing period, floods, droughts, and other unusual weather conditions that may affect 1943 crops. They will also help to cut annual feed and building loss from farm fires.

Experiments have shown that the hay crops, all of which are richer in nutritive elements when immature than when mature, can be safely and economically saved by siloing. Conservation of this extra portion of nutrients is especially profitable in dairying regions, for these immature crops of grasses afford a greater percentage of carotene which is converted into vitamin A, by the dairy cow. This vitamin plays a profitable triple role in dairying by aiding normal animal reproduction, decreasing calving losses, and increasing the vitamin A content of milk products for human consumption.

SILAGE EXTENDS PASTURE BENEFITS. Good pasture is fundamental to successful dairying, and silage provides an increased amount of the essential values of fresh crops for feeding during the winter months, is palatable and is consumed without waste. Dairy cattle, beef cattle, and sheep can all be fed silage with satisfactory results, and it may be used for limited feeding of horses and mules.

CROPS BEST SUITED FOR SILAGE. Any green forage crop can be made into silage that will keep in good condition without an excessive loss of food

nutrients. In general, feeds are not improved in palatability or nutritive values or affected detrimentally by silo preservation, the Department says. The best that can be expected is to have silage that is equal in feeding value to the green crop from which it is made. Fermentations that normally occur in the silo add nothing to the feeding value but neither should they materially depress the feeding value.

Corn is the most important silage crop in its growing regions, and usually yields more feed per acre as silage than any other crop. Much less dry matter is lost when corn is properly made into silage than when shocked. Furthermore only about 60 percent of the corn stover is consumed, whereas corn silage is all consumed.

Dry corn fodder can be used as silage but requires a large quantity of water in its preparation and is not as good as green corn silage. Dry corn stover silage is not recommended except as a last resort, as it is low in feeding value. Corn cannery refuse is another source of silage and can be preserved in stacks but is better if chopped and put in a silo. The feeding value, the Department says, is about two-thirds of normal corn silage.

Sweet sorghums, or "canes", and the other sorghums such as kafir, feterita, milo, hegari, and Sudan grass are suitable for silage in regions where conditions are not adapted to corn growing but should be harvested after the seed is hard to avoid high acid content in the silage. Sorghums provide less feed value than corn, and the Department reports that some investigations have shown that a greater proportion of sorghum seed than corn escapes digestion. However, where corn yield is small or uncertain, the sorghums may be satisfactorily used to replace part or all of the corn for silage.

Soybeans, cowpeas, alfalfa, clovers, lespedeza, vetches, and all other legumes are successful silage crops, but the Department does not advise their use as silage if conditions permit the making of good hay with certainty. There is no nutritional gain that would compensate for the extra labor of making a crop into silage provided the legumes could be harvested at the proper stage of maturity and the weather conditions were favorable for quick curing of the hay.

Soybeans grown and harvested with corn, Sudan grass, or millet, make successful silage mixtures and will increase the protein content of the silage. Per acre yield of soybeans and corn may be less than corn alone, but the silage is richer in protein and mineral matter. In this mixed planting, yields from drilling are greater than from checking.

Harvesting time for soybean and Sudan grass or millet mixtures should be determined by the proper maturity of the hay. Red clover grown with grasses should be cut and treated as legume silage if this crop predominates, or as grass silage if the grasses predominate.

Grass silage properly made is nutritious, of agreeable odor, and palatable, in addition to containing a very high content of carotene which animals convert into vitamin A.

As silage contains only about one-third as much dry matter as hay does,



the yield of silage can be estimated at 3 times that of hay. Timothy, orchard grass, or other heavy-yielding grasses should be grown if intended for harvesting as silage. Bluegrass yield per acre is generally lower than either timothy or orchard grass.

Likewise, it is thought possible that citrus peel and "rag," or fibrous material, waste from canneries could be used for silage, as beet pulp, apple pomace, and wet brewers' grain have been used as silage with some success.

Pea vines from canneries are generally made into silage by the stack method, though some are preserved in the tower type of silo. By the stack method spoilage is heavy, and the silage frequently has a strong odor and is very moist. It is reported that buyers in the regions where such pea-vine ensilage is made, consider it worth about one-third of alfalfa hay and only a little less than corn silage.

Beet tops and crowns can be made into silage of fair quality, the Department says, and its value is estimated roughly at one-half that of corn silage.

Sunflowers are used for silage in some regions and according to investigators sometimes yield a much greater tonnage than corn. A yield of 29.75 tons per acre in Montana has been reported. Sunflower silage will be unpalatable unless the plants are siloed shortly after blooming and before seed develop. This silage falls below corn in palatability and feed value, though it may be fully equal to some other kinds of silage the Department says.

METHODS OF MAKING SILAGE. Silage crops should be cut at the right stage of maturity, chopped fine, and preserved with the smallest possible amount of air and the right amount of moisture. Spoilage can be limited to the surface area, and usually should not exceed 10 percent, if silage is properly made.

Temperature during the making of silage is directly related to the amount of air in the silo and rises as long as any air is present in the silo. Temperatures over 100° F. are too high for proper preservation and if continued indicate that the air is not being properly excluded. Such silage will become moldy.

Odor and palatability of silage are directly related to the moisture content of the crop when the silo is filled, and to the amount of acidity developed during fermentation, which process chiefly affects the sugars and starches by decreasing the amount of these feed constituents.

Legumes and immature grasses with high moisture, protein, and calcium content should either be wilted or mixed with some dry materials such as hay or ground grain to reduce moisture content, or treated with molasses or acid in order to insure that the proper kind of fermentation takes place in the silage.

Three ways of preserving legumes have been proved acceptable: Filling in shallow layers and allowing each layer to heat to about 140° F. before the next layer is spread; adding acids or sugars, as in molasses, from which acids will be formed; and wilting until moisture is reduced. The first mentioned method is too slow, the next method is more expensive, and some acids may impair the palatability of the silage.

Wilting is recommended by the Department as the cheapest way to make good

quality legume silage. If harvested at hay-making stage of maturity the moisture of the legume plants is likely to be about 75 percent. This should be brought down to 68 percent or lower by wilting. Two hours exposure to the sun is ordinarily enough. If cut during a hot, dry spell the moisture content will be low enough so that it can be chopped into the silo at once. The Bureau of Dairy Industry has developed a simple home-made moisture tester that will enable the farmer to tell when enough wilting has taken place. Directions for making and using the tester can be obtained by writing that Bureau at Washington, D. C.

Cut legumes to 1/4 inch length and pack thoroughly. The heaviest part of the cut crop should be used for the last 2 or 3 feet of filling. Tramp the top every 2 days until settling ceases in order to prevent excessive spoilage of the top layer. Should leakage occur drain promptly and adequately to prevent waterlogging and impairment of silage quality.

Legume mixtures with grasses in which legumes predominate can be handled as legume silage, but if the grasses predominate and are harvested at the usual hay-making stage of maturity no wilting is necessary. Immature grasses are particularly valuable for their high content of carotene. Soybeans and Sudan or millet will make good silage without special treatment.

Wheat, barley, and oats can be made into silage without special treatment if cut at the proper time, finely chopped, and firmly packed.

Corn, the most important silage crop, is siloed without treatment or acids because its content of protein and calcium is low enough to develop sufficient acid for preservation, and wilting is not generally considered advantageous. The silage is palatable and will keep in good condition for years.

Corn increases in feed nutrients as it grows to maturity, and there is an advantage in planting a variety of corn that will reach maturity or near maturity in short-season regions before frost. The most advanced state for harvesting the corn is when about 90 percent of the kernels are dented, but best results are secured when cutting is started shortly before this time so that none will be overmatured before the crop is all siloed. Young corn packs better than fully matured corn. By the addition of the proper amount of water, silage can be made from ripe corn, frosted corn, and corn stover, but this silage is not as palatable or as valuable for feeding as the silage made from corn cut at the proper stage.

TYPES OF SILO. Farmers with good, tight silos are in a fortunate position and can use all the accepted methods of making silage, and resourceful farmers without such facilities can profitably use cheap, emergency types of silos.

Proper size of the silo will depend upon the number of head of livestock to be fed, but 10 head is the minimum number for economical feeding from ordinary tower-type silos, according to the Department, as it is necessary to remove 1 or 2 inches of silage from the entire surface daily after feeding is started, to prevent spoilage. For example, from a silo with inside diameter of 10 feet, 524 pounds of silage, enough to feed 13 head of animals 40 pounds, should be removed daily for best results. From a silo 20 feet in diameter a little over a ton of silage should be removed daily.



The spot selected for digging pit silos should be well drained and the soil firm and free from rocks. For best results a curb or collar of concrete from 4 to 6 inches thick, much as foundations to above-ground silos are constructed, should be placed around the pit and topped with a wall about 4 feet high. Walls of the pit must be plumb-line straight and lined with plaster reinforced with woven wire or metal lath.

Pit silos are comparatively inexpensive if the farmer builds his own. Thus, the only materials to be purchased are cement and wire mesh or metal lath, and, if not available on the farm, sand and gravel.

Cheapest and simplest in construction is the trench type of silo which can be built for just the labor cost. This type has long been used efficiently in the Southwest and other dry regions.

A hillside or slope is the most desirable place for a trench silo, but if such a place is not available the trench should be dug where drainage is good and easy removal of silage is possible.

Trench silos can be either lined or unlined but with proper lining and inexpensive roofing, these silos can be used satisfactorily for a long period of time. Usually a slope to the walls of 3 to 5 inches per foot gives best results. A lining of planks or concrete will keep the sides from caving when the silo is empty. It is sometimes necessary to provide a fence to prevent livestock from falling into the trench. Drains are required from the lower end of the trench for excess liquids, and around the trench to carry off rain water.

Disadvantages of trench silos include considerable spoilage and the tendency of the unlined walls to cave.

Picket, snow, and woven-wire fencing with or without lining can be used for hastily constructed emergency silos. Many varieties of tough, thick paper may be used for lining, and will reduce spoilage about one half, it is estimated.

Level ground is required for the fencing silos. The fencing should be fastened securely in a true circle, and the first tier lined and filled to within about 6 inches of the top. The second tier of fence should be set inside the first, lined and filled in the same manner. Other tiers are added until the desired height is reached. Experience has shown that a height equal to the diameter of the silo gives best results. Higher silos of this type should be encircled with a few posts to strengthen the walls against buckling.

In cases of even greater scarcity of lumber and wire, silos that give reasonably good results can be built of bales of straw or a shell of corn bundles or other bundled roughage if the silage material is chopped. Spoilage is generally limited to the outside, and the larger the stack the less the percentage of loss. Silos built of baled straw must be reinforced with wire or other material to withstand the lateral pressure of the silage.

Detailed instructions for building silos of proper size and construction may be had in USDA Farmers' Bulletin 1820.

The Department warns about the danger from the suffocating gas generated by the fermenting silage. Owners are urged to take every precaution by running the blower for several minutes during the filling period before anyone enters a pit silo, and in case of a very deep pit, a lantern should be lowered to ascertain whether or not the dangerous gases are present. If the lantern flame is extinguished the pit is unsafe until the air is thoroughly stirred.

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